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Navy Deputy Surgeon General Visits NMRC

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs



Navy Deputy Surgeon General C. Forrest Faison III (left) listens to Hospital Corpsman 1st Class Mark Salvador (right) explain one of the roles of the mobile laboratories, which are currently deployed to Liberia for the Ebola epidemic. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

SILVER SPRING, Md., -- The Navy's Deputy Surgeon General visited Naval Medical Research Center (NMRC) for a guided tour of the facility and its directorates, Dec. 9.

Rear Adm. C. Forrest Faison III and his accompanying staff members were greeted by NMRC Commanding Officer Capt. John W. Sanders upon arrival. Faison was scheduled to have a lunch with the junior officers and junior enlisted personnel at NMRC, hold an Admiral's call for all NMRC employees and finally tour three of NMRC's four directorates located at the headquarters building.

During the luncheon Faison took time to speak with every Sailor before he sat down and enjoyed more quality time with the junior officers and junior enlisted.

An Admiral's call was held in the Albert R. Behnke Auditorium immediately following the lunch. All NMRC personnel were in attendance. Faison touched on a variety of topics relevant to current changes in Navy Medicine. He also expressed his gratitude to the NMRC staff for continuing to be at the forefront of Navy Medicine. He then gave out three Admiral's challenge coins to NMRC military members for jobs well done.

A tour, led by NMRC directorate and department heads was next on the schedule. On the tour Faison had the opportunity to meet with NMRC's Biological Defense Research Directorate (BDRD) Deputy, Cmdr. Guillermo Pimentel; Infectious Diseases Directorate (IDD) Head Dr. Kevin Porter; Operational

(continued on page 3)

NMRC Commanding Officer's Message



2014 is ending and it's a good time to look back through this year's newsletters, highlight a few successes and align them with this month's theme of Global Health. Our laboratories are actively engaged in Global Health and the newsletters were full of great examples and I'd like to highlight a few stories here.

NAMRU-3: It was striking how many articles we ran early in the year concerning efforts to build laboratory and epidemiology capacity across Africa and the Middle East. The work the lab has done in West Africa over the last several years, especially in Liberia, has been critical in the fight to control the spread of Ebola Virus. **NMRC:** Several stories on responding to the Ebola epidemic included providing Critical Reagents for testing across the U.S. and Africa and the deployment of mobile labs to Liberia. I must also mention the heroic work of CDR David Brett-Major in providing essential clinical care to victims of Ebola Virus Disease while assigned to the World Health Organization.

NAMRU-6: Dr. Dan Bausch, a world leader in responding to Ebola, was featured, along with work done in helping Peru and partner nations prepare for a potential pandemic. **NAMRU-6** co-sponsored the 4th Annual ASTMH in Peru meeting strengthening scientific partnerships throughout the region. **NHRC:** Evaluating the PEPFAR program in Burkina Faso was featured. The management of this program continues to strengthen the health systems in Africa to deal with HIV and other emerging infections. **NAMRU-2:** During a visit from the SG, staff demonstrated multiple projects, including work on controlling and eliminating malaria in the region. **NAMRU-D:** Toxicology efforts included a story on the physical properties of nanoaerosols in the atmosphere which has implications for the health of our troops and the citizens of partner nations. **NAMRU-SA:** The dental wastewater filtering system provides excellent environmental protection with benefit to our troops and partners. **NSMRL:** Work on the Submarine Team Behaviors Tool led to a partnership with the British on developing better teamwork systems for the exploration of Antarctica.

It was obviously another great year for Navy Medicine R&D. I am really looking forward to getting to work with you on 2015!

NMRC Commanding Officer sends,
John. W. Sanders III, CAPT, MC, USN

NSMRL Commanding Officer's Message

I hope everyone had a wonderful Thanksgiving holiday! NSMRL is preparing for another New England winter. The trees have all shed their leaves and Groton is grey once again. None of this dissuades our scientists however and we are gearing up for some very interesting research. Submarine Survival and Escape is becoming a topic of interest in the Force. NSMRL is collaborating with multi-national groups in development of rescue capabilities.

Top priorities include training, enclosed atmosphere considerations, escape procedures, decompression sickness, and medical support requirements topside. Submarine escape training occurs at the Naval Submarine School's (SUBSCOL's) Pressurized Submarine Escape Trainer where they perform an escape via an actual submarine escape trunk that exits into a 37 foot water column. NSMRL is working with SUBSCOL and a panel of experts to optimize medical screening requirements to ensure safety while allowing increased throughput. The goal is to train each submariner to have the greatest familiarity with these systems to enhance survival in the event of a disabled submarine. Unplanned losses (UPLs) continue to plague the Submarine Force. We, as a Navy, are very good at identifying aptitude, but there has been less consideration of psychological aptitude. A significant portion of UPLs are due to psychological factors.

To aid in minimizing UPLs, NSMRL is researching functional improvements to the screening instrument, SUBSCREEN, while simultaneously re-purposing it to better identify those with an elevated risk to become a UPL. Another focus is to validate and move this screening to an earlier point in the accessions process, thereby ensuring those entering the pipeline will be able to complete it. Dr. Lamb (NSMRL Technical Director) was selected as the lead for the Fatigue working group. Fatigue is a universal problem across DoD and several of our labs have been performing great research and advancing our knowledge universally in this field. Dr. Lamb is leading the charge across the enterprise to coordinate our individual efforts. Through cooperative research and collaboration, I think we, as an enterprise, can make significant, scientifically-based progress in this important field. These are a few of our current projects.



NSMRL Commanding Officer sends,
Steven M. Wechsler, CAPT, MC, USN

(continued from page 1)

and Undersea Medicine Directorate (OUMD) Head Dr. Stephen Ahlers; OUMD Undersea Medicine Department Head Capt. David Regis; and, OUMD NeuroTrauma Department Head Dr. Richard McCarron.

Pimentel, along with his supporting researchers and staff members, displayed the setup of a mobile laboratory. Currently, NMRC has two mobile laboratories deployed in Liberia assisting in the global effort to combat the West African Ebola epidemic. Faison was shown each aspect of the mobile lab and given a brief synopsis of the work the mobile laboratory teams are performing in Liberia.

Porter escorted Faison into the insectary, which is shared by Navy and Army, for an overview of NMRC efforts in battling infectious diseases such as Malaria and Dengue Fever. There were also in-depth discussions on the research efforts of combating traveler's diarrhea and scrub typhus, and wound infections.

The tour concluded with a visit to the OUMD spaces hyperbaric chambers and blast tube area. In the blast tube area, Faison was able to witness a demonstration



Navy Deputy Surgeon General Rear Adm. C. Forrest Faison III (right) is escorted by NMRC Infectious Diseases Directorate (IDD) Head Dr. Kevin Porter (left) as they make their way to the NMRC/WRAIR insectary. The stop was part of a tour NMRC provided Faison and his staff. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

of the device, which is used in investigating effects explosions may cause to service members, such as traumatic brain injuries.

NMRC is headquarters to the Naval

Medical Research and Development Enterprise. Its mission is to conduct health and medical research, development, testing, evaluation, and surveillance to enhance deployment readiness of DoD personnel worldwide.

November Story Retraction

(continued from page 9)

In the November NMR&D newsletter article entitled "NAMRU-6 and NMRC Cooperate in Searching for Phages", the Armed Forces Health Surveillance Center-Global Emerging Infections Surveillance (AFHSC-GEIS) was identified as funding the effort. The effort is funded by the United States Medical Research Acquisition Activity (USAMRAA) through the Defense Medical Research and Development Program (DMRDP) Military Infectious Diseases Applied Research Award.

...which encodes the phage diagnostic product into cocktails of 4-5 phages which can infect a broad

will utilize an existing wound model at the Walter Reed Army Institute of

was collected from three hospitals in Lima and two in Iquitos and from



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Graphic illustration by Mikelle D. Smith, Naval Medical Research Center Public Affairs

Want to Improve Performance - Get Back to Sleep

Story by Sara Bessman, Research Associate and Lead Study Coordinator for the Sleep Research Team at the Naval Health Research Center

(Reprinted by permission from Future Forces Magazine, edited to fit newsletter format)



Corporal Nicholas W. Abey, a Houston native and a scout sniper with the Scout Sniper Platoon, Echo Company, grabbed the first spot he could find to sleep after a long night of patrolling. (Photo by Sgt. Earnest J. Barnes)

SAN DIEGO - According to the 2008 Human Performance Report by the Office of Defense Research and Engineering, the most important human performance factor in military effectiveness is degradation of performance under stressful conditions, particularly sleep deprivation.

The primary purpose of sleep remains a mystery, but it is indisputable that lack of sleep has significant negative consequences.

Studies have demonstrated that missing just one night of sleep results in cognitive performance impairments similar to those observed in individuals who are intoxicated.

A team of expert scientists and investigators at the Naval Health Research Center (NHRC) are researching sleep and its effects on warfighter performance and resilience.

Through ongoing experimental sleep research, including the evaluation of promising new mobile sleep monitoring technologies and various countermeasures for restoring physiological functions during sleep loss, the team hopes to identify innovative solutions that will have a tremendous effect on the health and welfare warfighters.

"Inadequate sleep has many immediate near-term consequences including difficulty concentrating, impaired learning and memory, and emotional instability," explained Dr. Rachel Markwald, sleep physiologist and lead investigator in NHRC's Physical and Cognitive Rehabilitation Environment Laboratory. "The longer-term health consequences of inadequate sleep, if sustained, include an increased risk of obesity, developing diabetes, hypertension, and heart attack."

"Whether we think of the aviation, submarine, surface warfare, special

operations, or any other warfighting communities, maintaining conditions for proper rest to optimize health and performance, both inside and outside their operational environments, is of utmost concern," said Navy Lt. Seth Reini, NHRC's research physiologist.

How can we learn to solve this problem of performance degradation after sleep deprivation? The answer requires going back to sleep.

To accurately assess sleep, the current gold standard in clinical practice is polysomnography. This procedure requires careful application of electrode sensors to the scalp, face, and other locations on the body and typically requires an overnight stay in a laboratory or hospital setting.

Physiological signals are recorded from the brain by what is known as the

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Navy Lab in Peru is Staying Ahead of Dengue and Chikungunya Infections in Latin America

Story by Lt. Robert Hontz



Female *Aedes albopictus* mosquito (Photo courtesy of NAMRU-6 Public Affairs)

LIMA, Peru – Tropical environments around the world provide perfect breeding habitats for mosquito species (vectors) known to transmit pathogenic viruses to humans. Two such viral diseases are dengue fever and Chikungunya fever. Chikungunya virus was recently introduced to the Western Hemisphere in 2013 within the Caribbean islands, and from there continues to spread north and south throughout the Americas by way of its most common vectors, *Aedes albopictus* and *Aedes aegypti*.

Dengue fever is caused by four related viruses known as serotypes (1-4); in fact, a dengue infection resulting from a single serotype does not provide immunity against the other three. Fever, headache, muscle and joint pain, and rash are the common symptoms of both dengue and Chikungunya virus infections.

Chikungunya virus infections are caused by a single virus which has a characteristic arthralgia (joint pain) and can be debilitating and last for months. Epidemics of these diseases are explosive, causing debilitating illness in large numbers of people very rapidly which could be devastating to operational readiness.

Along with greater than fifteen years of active and longitudinal surveillance activities in Iquitos, Peru, studying the epidemiology of dengue virus infection, *Aedes* transmission dynamics, and mosquito control interventions, the U.S. Naval Medical Research Unit No. 6 (NAMRU-6) conducts passive clinic-based febrile surveillance throughout Latin America at over two dozen sites in five countries. This effort is funded by the Global Emerging Infections Surveillance and Response System

Operations, a division of the Armed Forces Health Surveillance Center.

Acute blood specimens are analyzed by culture and PCR to detect dengue and other viral pathogens, and acute and convalescent samples are examined by IgM/IgG serology to test for seroconversions. NAMRU-6 currently performs Chikungunya PCR testing on dengue-negative specimens, and by mid-FY15 will have the capability to conduct Chikungunya serological testing on clinical specimens.

Capacity building designed to incorporate Chikungunya PCR and serological testing at several well-equipped febrile surveillance sentinel sites is the next step to expand the impact of NAMRU-6 febrile surveillance efforts in Latin America.

Research Team Publishes Paper on Possible Way to Prevent Skin Transplant Rejection

Story by Doris Ryan, Naval Medical Research Center Public Affairs

SILVER SPRING, Md. –A team of Navy researchers and collaborators working at the Naval Medical Research Center may have found a way to stop skin tissue rejection and published their results in the latest issue of STEM CELL Translational Medicine.

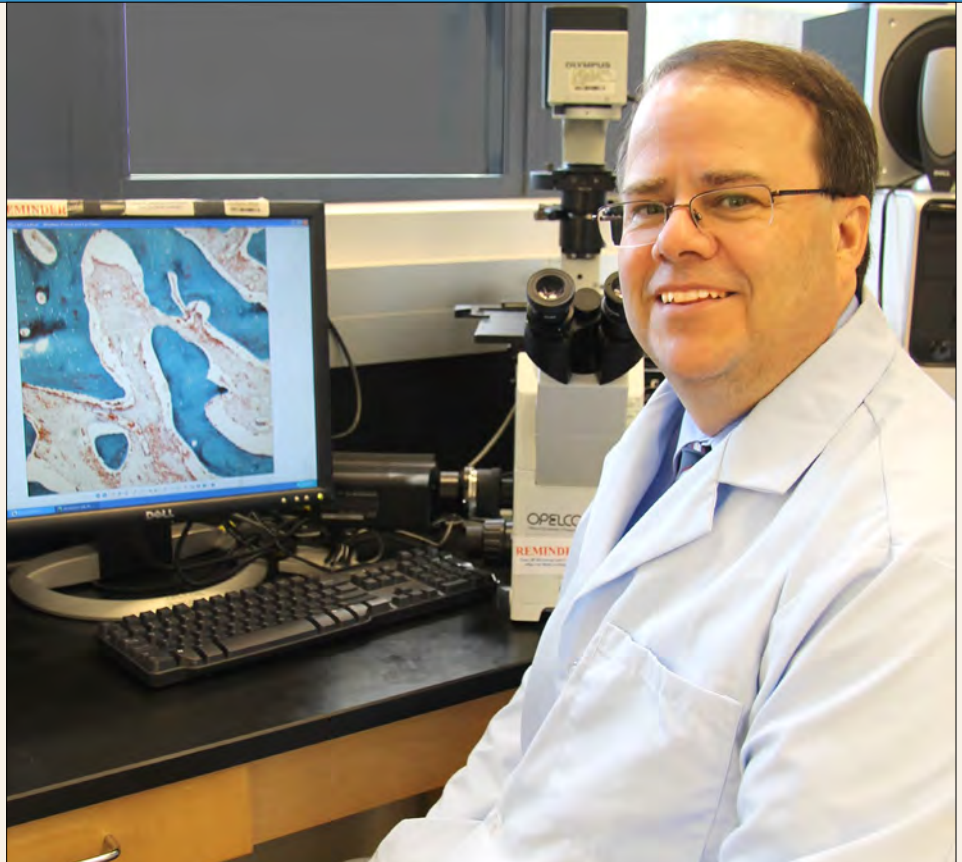
The team developed and tested a laboratory skin transplantation treatment model that supports the indefinite survival of donor transplanted skin grafts without use of long-term immunosuppression drug therapy. This novel approach entails the intravenous injection of a small number of donor bone marrow cells and human stem cells.

“We demonstrated in the laboratory that a single infusion of adipose-derived stromal cells (ASC), stem cells taken from human body fat in a minimally invasive procedure, from an unmatched donor combined with an extremely low dose of bone marrow cells resulted in stable long-term tolerance of the skin graft without rejection for 200 days after the initial graft,” said Thomas Davis, Ph.D., lead author on the paper and a contractor from the Henry M. Jackson Foundation.

Davis is working at the Naval Medical Research Center’s Regenerative Medicine Department.

Researchers still have a lot of work to do. From these preliminary studies, the next step is to test this strategy in pre-clinical studies to determine safety and efficacy. With promising results, this research will provide important knowledge about new ways to prevent rejection of transplanted organs.

“As we move forward, we are cautiously optimistic, appreciating that the transition from a laboratory model to proof-of-principle preclinical studies is challenging and not straightforward,” said Davis. “If successful, this technology has diverse therapeutic applications in clinical



Dr. Thomas Davis, a researcher working in the Naval Medical Research Center's Regenerative Medicine Department, views images of skin tissue. Davis and his team are currently working on finding a way to stop skin tissue rejection. Their results are published in the latest issue of STEM CELL Translational Medicine. (Photo courtesy of Dr. Thomas Davis)

transplantation in both military and civilian settings.”

Capt. Eric A. Elster, professor and Chairman, Norman M. Rich Department of Surgery, Uniformed Services University of the Health Sciences, helped lead the study.

“ASC constitutively produced high levels of anti-inflammatory immunoregulatory factors,” said Elster. “While further work is needed to validate this approach in other laboratory models before clinical trials can begin, the ability to use ASC, which are non-donor specific and clinically feasible, to induce tolerance opens a new horizon in transplantation.”

Traumatically injured warfighters often undergo complex tissue and limb reconstruction that includes procedures involving skin, muscle, bone, joint,

cartilage and nerve. Preservation and reconstruction is critical to long-term rehabilitation related to daily activities such as walking, eating, bathing and dressing.

Doctors are using reconstructive surgery to treat devastating combat wounds and burns and that includes tissue transplantation combined with long-term immune-suppression medications. Rejection of transplanted tissue from an unmatched donor can lead to critical complications.

The article, “Adipose-derived Stromal-Cells Promote Allograft Tolerance Induction,” can be accessed at <http://stemcellstm.alphamedpress.org/content/early/2014/11/18/sctm.2014-0131>.
short?rss=1

Looking Back ... NMRC sends Advanced Party to Liberia

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs



Navy Deputy Surgeon General Rear Adm. C. Forrest Faison III (left) listens to NMRC Biological Defense Research Directorate (BDRD) Deputy Director, Cmdr. Guillermo Pimentel explain the mobile lab teams involvement in the global effort against the West African Ebola epidemic. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

SILVER SPRING, Md., -- In September 2014 the global effort to fight the West African Ebola epidemic took Naval Medical Research Center (NMRC) staff to one of the hardest hit countries in the region – Liberia. The mission of the advance party – to scout locations, determine effective field protocols and properly set up two mobile laboratories to aid the local health care providers and facilities, other health agencies and resources, in combating the virus.

NMRC sent two individuals, Biological Defense Research Directorate (BDRD) Deputy Director Cmdr. Guillermo Pimentel and Command Chief, Chief Hospital Corpsman Jerrold Diederich, as an advanced party tasked with preparing for the mobile lab teams to begin work handling possible Ebola samples.

“This deployment solidifies NMRCs importance in global public health efforts and in force health protection. I am extremely proud of the work conducted by our Medical Service Corps microbiologists and biochemists and Navy Advanced Lab Techs providing support in this critical mission,” said Pimentel. “This mission was important not only from the global public

health perspective; but, it was also a threat against our national security. We deployed two labs across the Atlantic and became operational in just 14 days! In addition, our labs are saving lives every day! This is the pinnacle of my 23 years in the Navy!”

Part of Pimentel’s and Diederich’s duties were to meet officials from the Liberian Ministry of Health, the World Health Organization, the U.S. Centers for Disease Control and Prevention, and Joint Forces Command and clarify the mission and expectations for the NMRC mobile laboratories.

“We were trying to be there a week before the actual equipment and supplies showed up on site,” said Diederich. “We wanted an opportunity to physically be on the ground to try to coordinate things and make this as smooth as possible to get them [the mobile labs] in place and get them operating. Every day there were significant increases and reports of people testing positive with the limited amount of lab resources that were there ... it was important that we got up and running so our teams could begin testing samples identifying possibly Ebola infected blood.”

As the only mobile laboratories with the appropriate size capacity and mission credentials, the NMRC teams had to quickly assemble the necessary equipment to support the task at-hand. Responsibilities included ordering more than \$175,000 of supplies in less than two weeks to sustain the teams for 90 days; packing approximately 15,000 pounds of equipment and supplies in fewer than 24 hours. Deploying personnel spent seven days of intense lab training practicing the standard operating procedures they would be using in the field, which was specific to Ebola detection.

“The labs are comprised of Ph.D.’s and Advance Lab Technicians,” said Pimentel. “The Ph.D.’s are inactivating the virus [which] is the most dangerous and critical step. Once the virus is “killed”, following laboratory procedures are conducted by both the Ph.D.’s and the techs ... it is a team effort.”

As of December 12, 2014, the mobile laboratories have processed 2,800 samples working seven days a week, 12 hours a day. The numbers recorded are cumulative of the mobile labs in Bong County and Island Clinic.

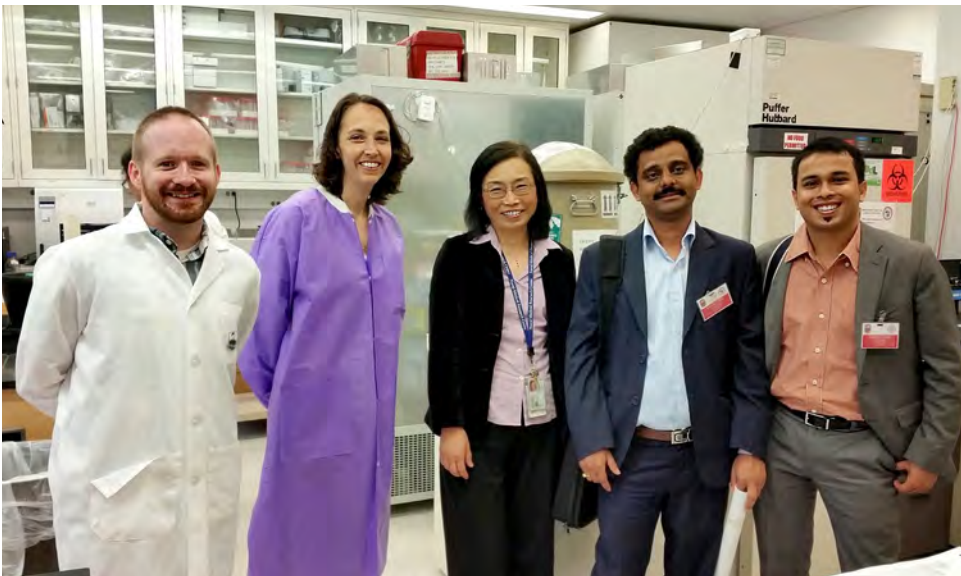
“It is important to remember that the mobile labs are not performing any patient care,” said Diederich. “At times they are testing repeat samples from patients fighting and recuperating from the disease. So the total number of samples tested in the mobile labs that are positive does not necessarily represent an overall number of positive cases because a patient needs to have a negative lab results before being cured. For every patient, it will take multiple samples and weeks before being released from an Ebola treatment unit.”

The mobile labs teams are providing top-notch results as professionally as possible.

“Setting up both labs was a humongous task that required team effort from NMRC and BDRD personnel,” said Pimentel. “The Defense Threat Reduction Agency Cooperative Biological Engagement Program was instrumental since they requested the services and are also covering all our deployment costs.”

Researchers from Navy Medicine and Notre Dame Collaborate on New Diagnostics Detection Tool

Story by Doris Ryan, Naval Medical Research Center Public Affairs



NMRC researcher Dr. Sheunn-Jue Wu (center), pictured with NMRC colleagues and Notre Dame guest Dr. Satyajyoti Senapati (2nd from right) and Dr. Sunny Shah (far right), meet in one of the Infectious Diseases Department labs at Naval Medical Research Center (NMRC), May 16. Shah and Satyajyoti are researchers from the University of Notre Dame's Department of Chemical and Biomolecular Engineering. (Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs)

SILVER SPRING, Md. – Researchers from the Naval Medical Research Center (NMRC) and the University of Notre Dame have agreed to collaborate on the engineering and application of a new field-deployable assay for the detection of infectious diseases, with the initial focus on the detection of dengue fever.

Currently, there are no U.S. Food and Drug Administration-approved rapid diagnostic tests to distinguish dengue virus infections from other febrile infectious diseases.

“This kind of assay could provide critical information and enable rapid response during an emerging outbreak of dengue. The recent Ebola outbreak in West Africa has shown there is a great need for additional tools that can help both military and civilian health workers track the spread of a disease over broad geographical areas,”

said Dr. Shuenn-Jue Wu, principal investigator and senior scientist with the NMRC's Viral and Rickettsial Diseases Department. “Current long-term military strategy is focused on USPACOM where dengue is endemic. The incidence and virulence of dengue is also increasing in USSOUTHCOM. This assay could be a valuable tool because it will be relatively cheap, accurate, and used in areas without a lot of medical infrastructure.”

The initial clinical presentations of acute febrile illness from many infectious causes are the same: fever, chills, sweats, headaches, muscle pain, and fatigue.

Clinical signs and symptoms are often not sufficient to make an accurate differential diagnosis of dengue. Rapidly identifying the pathogen causing an infection will also enable appropriate treatment and

management of infected patients, as well as implementation of prevention and control efforts to protect the remainder of the force.

“Dengue-associated mortality can be reduced from twenty to thirty percent in severe cases to less than one percent with appropriate fluid replacement and supportive care,” said Wu. “This is greatly facilitated by early diagnosis, because a positive laboratory test often alerts physicians to closely monitor patients for the warning symptoms associated with severe disease. Also, identification of dengue virus infections can geographically focus countermeasures such as targeted vector control.”

Once the prototype is available, the research team plans on working with NMRC's subordinate commands in Peru and Cambodia to collect clinical samples and test the assay in a pilot clinical study. If successful they will reach out to an industry partner to transform the prototype into a final assay with supporting materials.

Then the assay will be used in a future multicenter clinical study to meet FDA clearance requirements.

Wu went on to explain the goal is to develop a push-button technology that would allow the use of this assay in various geographical settings without the need for highly trained personnel. While the initial deployment of the device would target use by military personnel with extensive training in the laboratory, the researcher anticipates the long-term use of the assay by health care providers at clinics in resource limited settings.

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NMRC Researchers and Collaborators continue search for Dengue Vaccine

Story by Doris Ryan, Naval Medical Research Center Public Affairs



Lt. Michael Kavanaugh, assigned to Navy Entomology Center of Excellence at Naval Air Station Jacksonville, Fla., sets traps for mosquitoes and sand flies at the Guatemala Kaibil Special Forces base in Puerto Barrios, Guatemala. Kavanaugh is setting the traps to test the insects for malaria and dengue. (U.S. Navy photo by Mass Communication Specialist 2nd Class Bryan Weyers/Released)

SILVER SPRING, Md. – A real health threat for military personnel who deploy to endemic areas, dengue fever is spread by a mosquito-borne virus that causes sudden fever, rash, and acute pains in the joint, and sometimes leads to death. There are no vaccines to prevent or specific medications to treat dengue virus infections. Currently the most effective measures are those that avoid mosquito bites.

Researchers at the Naval Medical Research Center (NMRC) and their collaborators are focused on pre-clinical through clinical vaccine and therapeutic development as well as diagnostics for dengue.

“Dengue is the fastest spreading mosquito borne disease in the

world and is endemic in more than 100 countries with an estimated 96 million infections resulting in clinical disease annually,” said Lt. Cmdr. Maya Williams, head of the NMRC Viral and Rickettsial Diseases Department. “Dengue has impacted military operations since the Spanish-American War. During World War II almost 90,000 troops were diagnosed with dengue and the military began pursuit of an effective vaccine. More recently, the impact of dengue on military operations has been documented for Operation Restore Hope in Somalia, Operation Uphold Democracy in Haiti as well as in troops who were incapacitated by dengue in deployments in South America and Asia.”

A person infected with any one of the four serotypes of dengue virus develops lifelong immunity to that one form of the virus, but a secondary infection with a different form of the virus can lead to dengue hemorrhagic fever and dengue shock syndrome, the severe forms of the disease.

“Development of a vaccine for dengue is particularly challenging as there are four serotypes of dengue virus,” said Williams. “A vaccine needs to be able to protect military personnel against disease caused by any of the four serotypes.”

She went on to add that Sanofi Pasteur is furthest along in dengue vaccine

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R&D Chronicles

Navy Medicine's Scientific Foundation

*The Museum of Hygiene, Navy Medicine's
Cabinet of Curiosities Part III*

By Andre B. Sobosinski, Historian, Bureau of Medicine and Surgery



Medical Director Philip Wales (1837-1906), Surgeon General and Museum Founder. Surgeon General Philip Wales (1837-1906) issued a circular in 1882 asking for "contributions and co-operations of all interested in sanitary matters, to make this attempt [at establishing a medical museum] a success." (Photo courtesy of BUMED Archives)

Founded in 1882, the Naval Museum of Hygiene was a short-lived and peculiar institution originally designed to showcase exhibits documenting the "progress in sanitary science."

An article published in 1900 paints a picture of an institution with questionable mass appeal: "The whole atmosphere of the interior is light, airy, clean, and polished, the inlaid floors waxed, the white arches leading in long

To collect and classify their present efforts and progress in sanitary science and make them available for use and to assist in maintaining the highest possible standard of health for our Navy are principal objects of this museum.

~Medical Director Newton Bates, USN, Superintendent of the Museum of Hygiene 1894

vistas into the various exhibit rooms.

In the main hall, the exhibits of hospital service are arranged, together with a miscellaneous assortment of clothing and ornaments from Korea, Mexico, Japan, China, and the South Seas, and different specimens of life preservers.

In the corridor leading into the main room is the metallic burial casket, like those sent to Siberia to receive the bodies of the officers who perished in the *Jeannette*. Also a model of the Parsee 'Tower of Silence'; burglar-proof grave vaults, crematories and urns.

There is an Alaskan burial urn, which contains the remains of an Alaskan Indian, and an old Roman cinerary urn, which also contains some ashes." ("Field of the Red Cross: Modern Appliances for Hospital Service at Museum." *The Washington Post*, September 23, 1900)

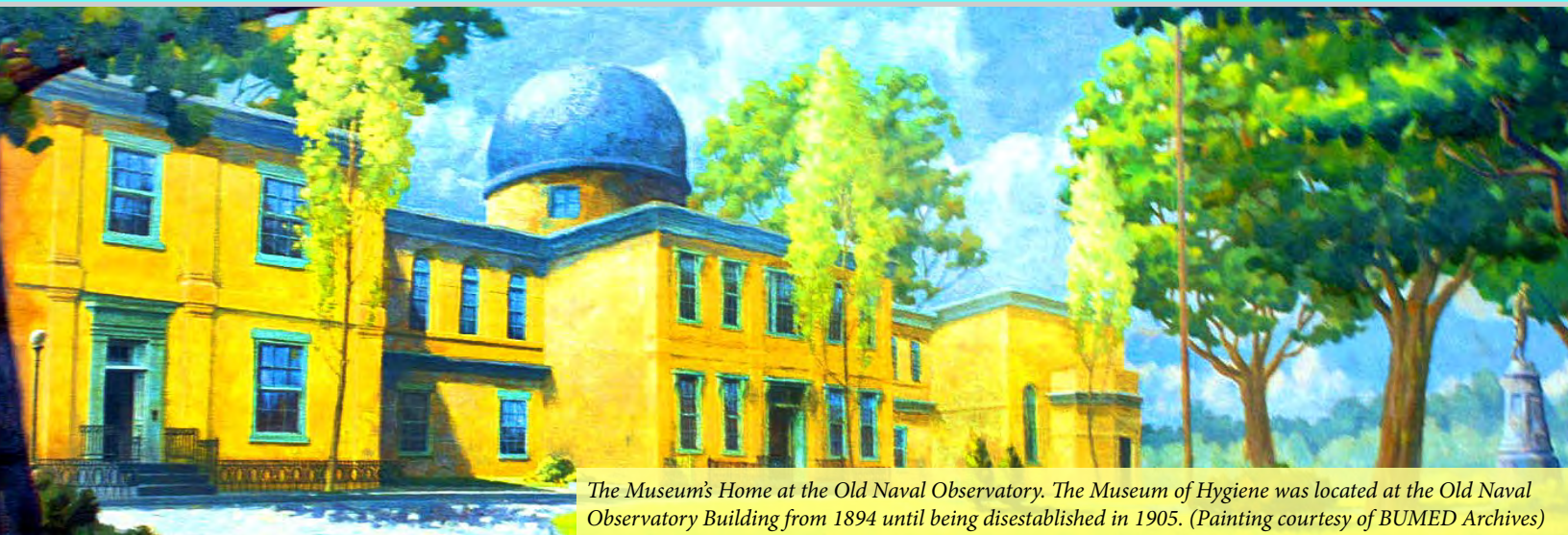
In addition to being a clearinghouse of medical artifacts, at its peak the Museum

housed a 12,000 volume medical research library and an "experimental laboratory" used for a wide-spectrum of research.

Over the years, the laboratory scientists tested disinfectants, the purity of catgut sutures, examined the "clinical value" of the steel used in U.S. Navy's guns (1887), conducted experiments on water purification through filtration (1890s), and conducted an assortment of chemical, bacteriological and microscopic examinations for the purpose of clinical diagnosis.

On May 27 1902, the Navy Medical School was established at the Museum, and the new institution was renamed the "U.S. Naval Museum of Hygiene and Medical School."

Three years later on 20 May 1905, the Naval Museum of Hygiene was disestablished. The Museum's library and laboratory were subsumed under the Navy Medical School and the collection of artifacts was transferred to the National Museum (Smithsonian Institute).



The Museum's Home at the Old Naval Observatory. The Museum of Hygiene was located at the Old Naval Observatory Building from 1894 until being disestablished in 1905. (Painting courtesy of BUMED Archives)

Researchers from Navy Medicine and Notre Dame Collaborate on New Diagnostics Detection Tool

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"I feel it is imperative to continue exploring innovative technologies such as this collaboration with Notre Dame for use in low-resource settings to address the performance limitations of the traditional rapid diagnostic tests," said Wu.

For more than 25 years, Wu has been

involved in many aspects of dengue research and development including vaccines, pathogenesis and diagnostics at NMRC.

Over the past 15 years she has focused on developing and evaluating field-deployable diagnostic assays for dengue fever and other military

relevant infectious diseases. As a principal investigator she has coordinated with companies and overseas field sites and successfully completed international multicenter clinical trials of other dengue diagnostic devices aiming for FDA approval.

Want to Improve Performance - Get Back to Sleep

(continued from page 4)

sleep electroencephalograph (EEG). In combination with information about eye and skeletal muscle activity, the EEG provides detailed information about the different sleep stages we cycle through over the course of a night.

"Interestingly, each of these stages looks like a completely different physiological state in terms of brain activity and muscle tension," said Dr. Gena Glickman, sleep and circadian biologist and lead investigator in NHRC's Biobehavioral Sciences Lab. "It is, therefore, fair to say that not all sleep is created equally, and further, it is likely that these different stages also have different functions."

Additional vitals are often monitored simultaneously, including respiratory function and heart rate.

This detailed observation of sleep is necessary for identifying and distinguishing between various sleep disorders and determining the most appropriate treatment.

"Unfortunately, obtaining proper measurements of sleep quality outside of a highly controlled sleep lab has historically been difficult and not very practical," Reini said. "Traditional, gold-standard sleep monitoring technologies are invasive and immobile."

Not only does sleep cycle in stages over the course of a night, but a typical night of sleep will vary over the course of a career as well.

This is particularly true in active-duty service members who must contend with frequently changing work demands and environmental conditions across various phases of the deployment cycle.

Beyond these individual changes, there is significant variation between individuals in terms of the amount of sleep required to perform at optimal levels. For warfighters, these differences must be considered when optimizing performance, resilience, and reset.

Traditionally, the only option to characterize these important differences was with polysomnography. Because of the technical requirements and costs associated with performing, analyzing, and interpreting the data it is not a feasible method for monitoring sleep health in active-duty service members while on deployment.

"Validation of noninvasive, highly mobile sleep monitoring technologies would allow for more robust monitoring and evaluation of sleep within a patient's natural sleeping environment," said Reini. "We could monitor sleep both at home and in the operating environment."

At NHRC, several studies are currently under way testing the efficacy of various technologies that have the potential to assess sleep health in the field.

The sleep research team is seeking tools with the precision and detail necessary for rigorous characterization of sleep quality, identification of sleep disturbances, and, ultimately, earlier and more individually tailored countermeasures.

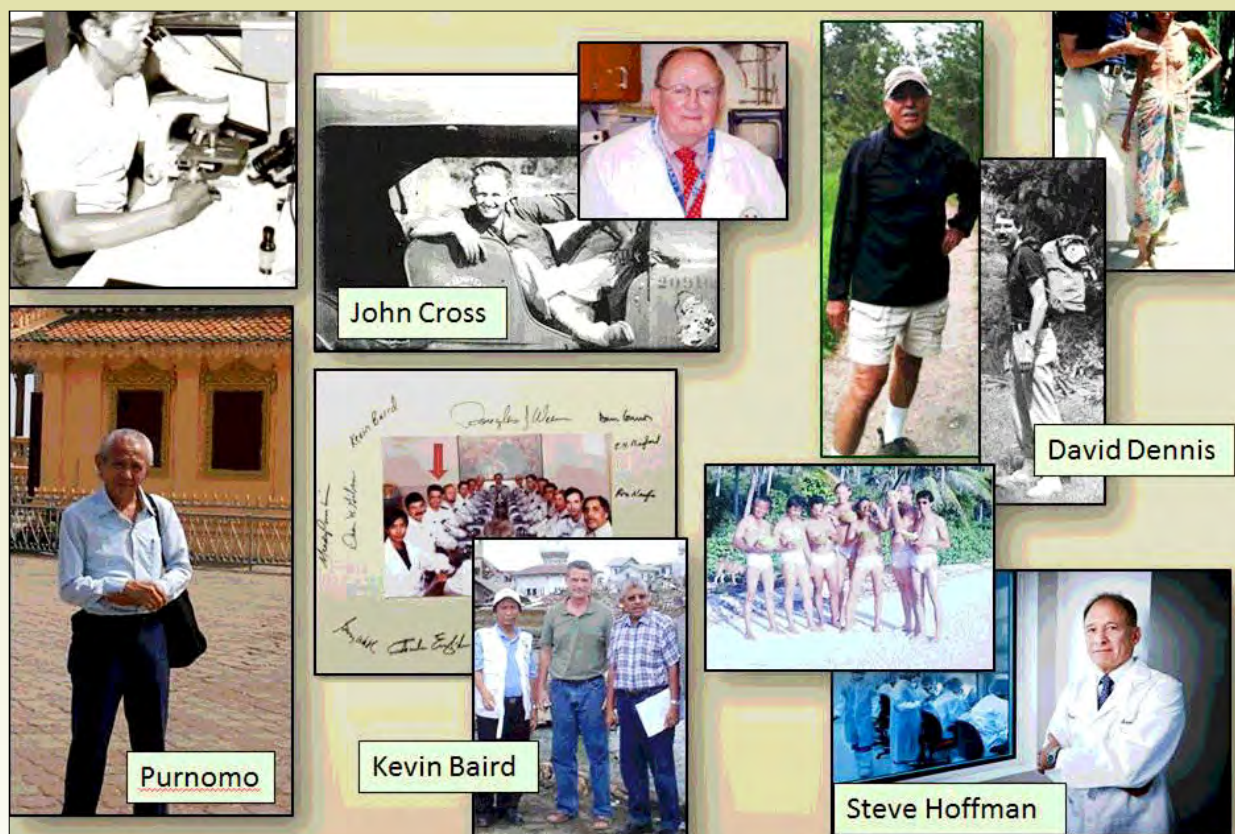
"Finding this could be a true game-changer," said Reini. "For researchers and medical experts to be able to track and improve sleep quality for our warfighters, this could have a major impact on the overall health and performance of our warfighters."

The team's long-term goal includes developing a model of warfighter readiness that includes information about warfighters' sleep histories to predict future performance.

Specifically, the ability to assess repeatedly and accurately sleep patterns over time will be necessary for understanding and tailoring performance optimization strategies for every warfighter.

NAMRU-2 Reunion: Celebrating 70 years of Research in the Pacific

Story courtesy of NAMRU-2 Public Affairs



NEW ORLEANS, Louisiana – At the recent annual meeting of the American Society of Tropical Medicine and Hygiene (ASTMH), November 2 - 6, alumni from U.S. Naval Medical Research Unit Two (NAMRU-2) held a very special symposium celebrating 70 years of Pacific service.

The symposium entitled *NAMRU-2 at 70 Years: Partnering Military Medical Research and Tropical Public Health in the Asia Pacific* saw the likes of distinguished alum: Kevin Baird, Larry Laughlin, James Palmieri, Stephen Hoffman, Chris Daniel, Al Richards, Tom Richie and Narain Punjabi. Many former foreign, U.S. and current NAMRU-2 staff joined in the symposium and were treated to anecdotes, research accomplishments and good old fashioned “sea stories.”

“It was astonishing to hear the stories and see the pictures of the men and women who were instrumental in combating significant disease threats, while also

shaping the future of overseas research” said NAMRU-2 Commanding Officer Capt. Marshall Monteville.

This was the first such symposium held in honor of a single overseas military research laboratory and was very well attended.

“I was able to count about 70-80 participants, and the majority of them were not American or Indonesian, and even the Executive Director of ASTMH Karen Goraleski, was in attendance and was tweeting about the symposium and NAMRU-2,” said Lt. Cmdr. Dustin Harrison.

The symposium organizers also put together a cocktail reception and dinner following the day’s events.

The contributions made to military and global public health over the past seven decades have been significant, ranging from cholera and typhoid treatment to

HIV and avian influenza. The heart and soul of NAMRU-2 has, and continues, to reside in the locally employed staffs who have so faithfully contributed to the success of the institution.

Originally established in Guam in 1944 as the first overseas medical research unit, the command has relocated its headquarters element a total of five times with it currently residing in Singapore. NAMRU-2 continues to maintain a laboratory in Phnom Penh, Cambodia, and conducts research in Thailand, Lao, and Vietnam. Over the course of its history through research collaborations with local partners, the command has been a pioneer in the battle against tropical infectious disease.

NAMRU-2 will continue to carry on the legacy of the accomplished scientists of the past by conducting quality science critical to the health of the men and women in uniform, as well as our partner nations in the Pacific.



Albert Lasker Award for Clinical Research Awarded in 1967

Text courtesy of The Lasker Foundation Web site

NMRC researcher Dr. Robert Allen Phillips received the Albert Lasker Clinical Medical Research Award in 1967 for his enormous contribution to the understanding of the mechanism of death in cholera, and the development of a life-saving method of treating it.

Dr. Phillips's research and leadership were responsible for the reduction in cholera from a death rate of over 60 percent in formerly untreated cases to a death rate of less than 1 percent in cases treated by his method.

In 1919, the disease — especially rampant throughout the Philippines, the Asian world and China—claimed

1,055,449 lives, with an economic loss of untold millions of dollars to the countries involved. In 1943, before Dr. Phillips's work, almost half a million people died of cholera in India and Pakistan alone.

As a result of his field studies, conducted in the Far East, Dr. Phillips observed that the chief killing element in cholera is the dehydration of the victim.

He devised a method of replacing the body's fluids, salts, and other chemical compounds, called electrolytes, which are necessary to various physiological processes essential to life. Electrolytes are lost by the victim in the course of

the disease and are needed to bring the body chemistry back into balance.

This life-saving therapy of rapidly replacing, intravenously, these lost body fluids and compounds was so simple that it could be successfully administered in the field, even under the most elementary conditions, and even by relatively unskilled personnel.

Dr. Phillips devoted his life to the training of others, both on an individual and nationwide scale. The institutions he directed became both local and world centers for the training of doctors, scientists, and health officials from many nations.

Contractor Joins NMRC Mobile Lab Teams in Liberia

Story by Mikelle D. Smith, Naval Medical Research Center Public Affairs



Henry M. Jackson Foundation contractor Dr. Ketan Patel (right) and NMRC Microbiologist Lt. Jose Garcia (left) set up equipment in the Island Clinic mobile laboratory. NMRC mobile laboratories are currently deployed to Liberia to aide in the global effort against the West African Ebola epidemic. (Photo courtesy of Dr. Ketan Patel)

SILVER SPRING, Md., -- When Naval Medical Research Center's (NMRC) mobile laboratories were requested in Liberia, one contractor never guessed he'd be part of a promising military team helping fight the West African Ebola epidemic.

Henry M. Jackson Foundation contractor Dr. Ketan Patel expressed his gratitude to the NMRC Commanding Officer Capt. John W. Sanders and Biological Defense Research Directorate (BDRD) staff for giving him the opportunity to deploy with the mobile laboratories to West Africa to combat the Ebola epidemic.

"It is hard for me to describe the experience in words other than to say, I have never been part of a team that has positively impacted the outcome

of an outbreak as the Navy mobile labs have and still are in Liberia," said Patel. "Responding to this outbreak was a real test for me to see if I could perform in a real world event. Till now, I was limited to scenarios ... I now have the real world data that I can successfully work in a team environment and apply my knowledge and skills to respond to outbreak."

Patel was part of an advanced team of NMRC personnel sent to Liberia for the Ebola epidemic. While there he was able to work with many different individuals, including NMRC military researchers and other health agency doctors.

"This opportunity allowed me to work with the U.S. Navy officers," said Patel. "I was very impressed by the

officers ... they organized, packed up, transported, unloaded and established a working mobile lab in such a short time with little information of how, when and where. Cmdr. Pimentel and Chief Diederich built the foundation on which everything else would be built. They allowed us to focus on setting up the lab and allowed us to start processing samples in just a day-and-a-half."

Elaborating on his experience with working with foreign agency doctors at the Island Clinic mobile laboratory location, Patel explained the importance and hard work and dedication put in by the doctors and nurses.

"A lot of credit goes to the doctors

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NMRC Researchers and Collaborators continue search for Dengue Vaccine

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development and has completed Phase III vaccine clinical trials in endemic countries in Asia and South America (NMRC is not a partner in the Sanofi Pasteur studies).

In these trials, the overall vaccine efficacy was nearly sixty percent; however, a caveat of particular importance to the DoD is that most of the volunteers had previously been naturally infected by a dengue virus. In contrast to a military or traveler population, most of the volunteers' immune systems had already been primed to respond to a dengue virus infection.

"When calculations for vaccine efficacy in these trials are limited to volunteers who are more immunologically comparable to military and traveler populations, the vaccine efficacy is only about thirty percent," said Williams.

NMRC collaborates with the Army and other DoD agencies, industry, and universities to accomplish the goal of developing a dengue vaccine. Vaccine development is a very complicated process that requires a wide range of expertise and technologies, Williams explained.

NMRC continues to evaluate new products and technologies with the goal of developing a vaccine against dengue that will be suitable for military populations.

Vaccine development is a complex process. It begins with laboratory studies and moves to pre-clinical studies to assess the safety and immunogenicity or the ability to induce an immune response in laboratory models.

Next are the vaccine clinical trials. Phase I clinical trials include a small

group of volunteers to assess the safety and determine if there is an immune response.

Phase II vaccine clinical trials focus on a larger group of volunteers to determine safety and immunogenicity as well as proposed doses, schedule of immunization and method of delivery.

Phase III vaccine clinical trials focus on an even larger group of volunteers where researchers continue to assess the vaccine's effectiveness in the population in which the vaccine is intended.

Success with clinical trials moves the vaccine toward U.S. Food and Drug Administration (FDA) approval and licensure by industry. It can take 10 to 15 years of research and testing before a vaccine is available to the public.

BUMED Historian Conducts Oral History with NMRC Chief

Photo taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs



Naval Medical Research Center (NMRC) Command Chief, Chief Jerrold Diederich (right) sits with Bureau of Medicine and Surgery (BUMED) Historian, Andre Sobosinski (left) as an oral history is conducted. Sobosinski captured Diederich's perspective on NMRC's participation in the West African Ebola epidemic in Liberia. Diederich was deployed to Liberia on an advanced party to assist in preparing NMRC's Biological Defense Research Directorate (BDRD) mobile lab teams for their involvement in fighting the Ebola virus outbreak in the country. Diederich spoke about his experience as one of the first NMRC personnel on-ground and the immense work NMRC mobile lab team personnel is providing during the crisis. The oral history will be kept in the BUMED archives.

NAMRU-3 Works with Egyptian Ministry of Health to Reduce Hospital-acquired Infections

Story courtesy of NAMRU-3 Public Affairs



The Egyptian Minister of Health and Population presents a certificate for excellence in surveillance to Dr. Afifi. From left to right: H.E. Dr. Adel Adawy, Minister of Health and Population; Capt. John Gilstad, Commanding Officer NAMRU-3, and Dr. Iman Afifi, Head Infection Control Team from Ain Shams University Medical Hospital. (Photo courtesy of NAMRU-3 Public Affairs)

CAIRO - The U.S. Naval Medical Research Unit No. 3's (NAMRU-3) Commanding Officer and scientific staff shared the podium with senior Egyptian and USAID Cairo officials as the Egyptian Ministry of Health launched the next phase of its strategy to reduce hospital-acquired infections (HAI) and antimicrobial resistance in Egypt, November 23.

H.E. Prof. Dr. Adel Adawy, the Egyptian Minister of Health and Population, was the lead speaker at the launch event at which hundreds of public health officials, members of the Supreme Council of Universities and the press gathered to learn about this multi-year program.

NAMRU-3 Commanding Officer Capt. John Gilstad and USAID Egypt Director Dr. Mary Ott delivered congratulatory remarks.

Dr Maha Talaat, the CDC's Global Disease

Detection and Response (GDDRP) HAI project manager, presented data on the successful first phase of the project, which was supported by USAID and implemented in partnership with NAMRU-3.

"Egypt will be the first developing country in the Eastern Mediterranean region to institute a national program for surveillance of hospital-acquired infections and antimicrobial resistance to promote the quality of safety of healthcare provided in Egypt" said Talaat.

Bacterial infections acquired in hospitalized patients and subsequent infections and antibiotic resistance lead to higher incidence of disease complications, longer hospital stays, and increased costs of healthcare services.

The pilot project established training and infection surveillance programs in 42

ministry, university, and private sector hospitals.

"NAMRU-3's collaboration with the MOHP is directly contributing to reducing disease among Egyptians, while also helping to build capacity to address public health challenges," said NAMRU-3 Commanding Officer Capt. John Gilstad.

In the phase now beginning, these programs will be expanded to all intensive care unit beds nationwide and provide hospitals with access to national electronic reporting of hospital infection data using a cloud-hosted, web application.

This application will provide an automated means for ensuring the quality of data and provide participating hospitals with automated reports of their data.

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NAMRU-6 conducts first course on Concepts in Animal Research and Welfare in Peru

Story courtesy of NAMRU-6 Public Affairs



NAMRU-6 Commanding Officer, Capt. Kyle Petersen, INS Head Dr. Ernesto Bustamante (front/center) and course participants. (Photo courtesy of NAMRU-6 Public Affairs)

LIMA, Peru - The first International Course, "Basic Concepts in Animal Research and Welfare," was held at the Parquet de las Leyendas zoo in San Miguel, Lima, November 17 – 19.

The course succeeded in bringing together various animal research investigators, professors, and clinicians for the common goal of disseminating information on research animal welfare in Peru and in initiating a Peruvian Society for Animal Welfare in research in the near future that could take advantage of existing networks in Latin America to strengthen animal research ethics in Peru.

More than 20 Peruvian and international speakers from Spain, the United States, Brazil, Colombia, and Peru shared their knowledge and experience. The goal of the course was to promote scientific rigor in animal research, standardize practices, and establish networks for animal use and research in Peru. Animal

welfare is a responsibility that extends from appropriate animal housing and nutrition to disease prevention and treatment and, when necessary, humane euthanasia.

The principle of "3 Rs" Replacement, Reduction, and Refinement of animals in research was discussed in detail, focusing on their application, as well as on adequate appraisal of welfare and discomfort among animals, pain severity scales, anesthesia, analgesia, and euthanasia, among others.

There were discussions on the vast experience using genetically modified mice for research in the United States and other countries. Additionally, accreditation of animal use facilities and creation of Institutional Animal Use and Care Committees was addressed by professionals with extensive experience in these topics. The absence of regulations in Peru and the need to catch up to its neighbors in this area also received a great deal

of attention. Seventy attendees, mostly professors and researchers, were from universities and research centers located throughout Peru.

Sixty-seven percent of all attendees said the topics and the speakers were outstanding. There was a general consensus to launch future training activities spearheaded jointly by the major veterinary schools, the Peruvian Instituto Nacional de Salud (INS), and NAMRU-6 in order to maximize available resources.

This event was organized by NAMRU-6, Parquet de las Leyendas, Universidad Nacional Mayor de San Marcos School of Veterinary Medicine, and Universidad Peruana Cayetano Heredia School of Public Health, and sponsored by INS, the Training Consortium on Epidemiological Research of Infectious Diseases in Peru, and the Servicio Nacional Forestal y de Fauna Silvestre.

NAMRU-3 provides Experts to WHO Surveillance Workshop

Story courtesy of NAMRU-3 Public Affairs



NAMRU-3's Dr. Maha Talaat (far right) participates in round table discussion at the workshop. (Photo courtesy of WHO EMRO.)

CAIRO - The Ministry of Health of Morocco hosted a World Health Organization (WHO) Eastern Mediterranean workshop to educate attendees on practices to enhance Severe Acute Respiratory Infections (SARI) surveillance, September 3 – 5.

WHO's Regional Office for the Eastern Mediterranean (EMRO) is working with other countries to initiate SARI surveillance and join the Eastern Mediterranean Acute Respiratory Infection Syndrome (EMARIS) network. Representatives from regional infection control units and surveillance coordinators from the Ministries of Health from 23 countries discussed their preparedness for the detection of MERS-CoV.

The U.S. Naval Medical Research Unit No. Three (NAMRU-3) Dr. Maha Talaat, Lt. Cmdr. Gabriel Defang, Dr. Mayar Said, along with Susan Gerber from the Centers for Disease Control and Prevention (CDC), gave presentations supporting the workshop's objectives.

The workshop began with oral presentations followed by working

groups. One group discussed enhancement of ongoing SARI surveillance and another discussed pre and post-Hajj preparedness. Participants made suggestions and recommendations on using referral hospitals for suspected MERS-CoV cases returning from Hajj.

Said's presentation focused on NAMRU-3's training, testing and confirmation of suspected MERS-CoV infections, and how NAMRU-3 could provide assistance in building testing capacity to the EMRO countries. Talaat's presentation focused on strengthening infection prevention and control program in the Eastern Mediterranean Region.

"The workshop was influential because several countries that are not implementing SARI surveillance were convinced to opt into the regional program," said Talaat, an investigator in NAMRU-3's Global Disease Detection and Response Program (GDDRP) and regional SARI coordinator. "We have one standardized method for SARI enrollment, case definition, and

laboratory techniques for diagnostics."

NAMRU-3 GDDRP has implemented SARI surveillance using a standardized methodology, including the enrollment form. However, participating countries have had challenges doing analysis of data. A major advance in SARI surveillance has been the development of a CDC-funded, web-based application to report the SARI surveillance data.

With the application, countries will report and be able to review automated reports of the analysis of their data. The data will be quality checked for completeness and accuracy through the application and reported to the SARI network and WHO Geneva.

NAMRU-3's role as a reference laboratory for respiratory pathogens makes it a strong partner in the EMRO region. Through NAMRU-3, the Armed Forces Health Surveillance Center is sponsoring surveillance in Jordan and Egypt, while funds from the Department of State support surveillance in Yemen.

NMRC Joint Multicultural Committee Celebrates Native American Heritage Month

Photos taken by Mikelle D. Smith, Naval Medical Research Center Public Affairs



Naval Medical Research Center (along with Walter Reed Army Institute of Research) Joint Multicultural Committee, put on a ceremony recognizing Native American Heritage Month. The "One Heart One Mind Interpretive Center" from Charles Town, W.Va., put on an amazing history and heritage demonstration displaying the contributions of Native Americans to United States history. Festivities included numerous Native American tribal songs, prayers, historical lessons, an authentic hoop dance and displays of various native american artifacts, all courtesy of the "One Heart One Mind Interpretive Center."



NAMRU-3 Works with Egyptian Ministry of Health to Reduce Hospital-acquired Infections

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Hospital infection control teams will use these data to tailor their prevention efforts to reduce transmission of hospital-acquired infections and antimicrobial resistance. It is hoped that these initiatives will lead to higher quality health services in Egypt.

"Americans and Egyptians have a legacy of working together to promote the health and well-being of the Egyptian people," said Dr. Ott. "Working together to monitor the level of antibiotic-resistant infections in hospitals and build the reporting capacity of healthcare providers will help to improve health care for Egyptians."

"This NAMRU-3 GDDRP initiative is a great example of its integration with the Department of Health and Human Services for scientific productivity," said Dr. Mark Wooster, Head of the CDC GDDRP Program which is embedded within NAMRU-3.

Naval Health Research Center Celebrates Native American Heritage Month

Story courtesy of NHRC Public Affairs



NHRC's Diversity Officers and Research Psychologists Army Capt. Carrie Donoho (left) and Navy Lt. Michael Young (right) learn about pre-Columbian artifacts used by the Kumeyaay Nation from an educational specialist representing the San Diego Museum of Man at NHRC headquarters San Diego Nov. 19. (Photo courtesy of NHRC Public Affairs)

SAN DIEGO - Naval Health Research Center (NHRC) staff celebrated Native American Heritage Month with a presentation about the Kumeyaay Nation and native foods sampling at NHRC headquarters San Diego, Nov. 19.

More than 100 staff members attended the presentation given by an educational specialist from the San Diego Museum of Man, and learned about Kumeyaay history, culture and ceremonial traditions.

"Being in the military and moving every two to three years, it's important to actively engage in the community we're stationed in and learn about the cultures that surround us," said NHRC's Diversity Officer and Research Psychologist Army Capt. Carrie Donoho. "Here in San Diego, the Kumeyaay Nation has deep roots and it was interesting to learn about their traditions."

The Kumeyaay Nation, according to the presentation, has been in the San Diego area since pre-Columbian times. They

are a nation rich in tradition that has been preserved by the people despite a tumultuous history.

"Learning about how the culture was preserved despite the many attempts to influence it is a testimony to the strength of their nation," said Jan Dickieson, program management specialist.

Throughout the presentation, the staff was given the opportunity to see pre-Columbian artifacts, tools, clothing items and ceremonial items from the Kumeyaay Nation. Sweet cornbread and coffee was served for all in attendance.

With more than 55 years since being established by the Navy's Chief of Naval Operations, NHRC has maintained a diverse workforce both in culture and expertise. The command-wide diversity program, led by Army Capt. Carrie Donoho and Navy Lt. Michael Young, hosts a variety of informational and educational events and programs throughout the year.

The most recent was a community outreach event with local Science, Technology, Engineering and Math (STEM) schools and an informational booth for National Disability Employment Awareness Month in October.

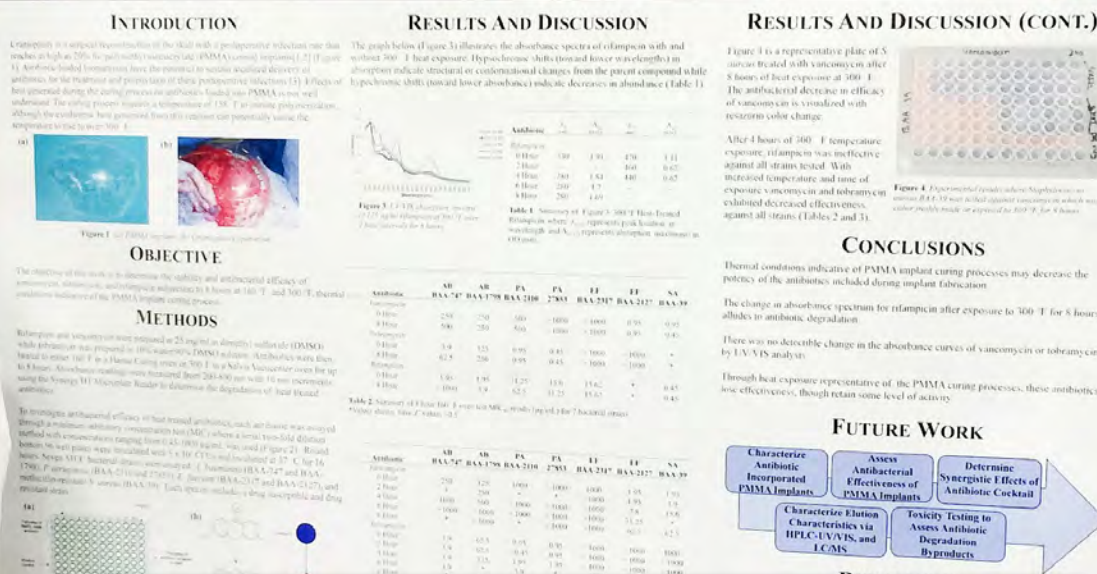
"There's a great value in celebrating our diversity in the Navy," said Donoho. "We can better understand each other, gain an appreciation of our diverse perspectives, and ultimately, this will lead to effectively achieving our mission."

As the Department of Defense's premier deployment health research center, NHRC's cutting-edge research and development is used to optimize the operational health and readiness of the nation's armed forces.

Within close proximity to more than 95,000 uniformed service members, world-class universities, and industry partners, NHRC's expert team sets the standards in joint ventures, innovation, and practical application.

NAMRU-SA's Intern Presents Poster at Biomedical Engineering Society's Annual Meeting

Jason M. Chang, Tamara N. Hess, M.S., Mauris N. DeSilva, Ph.D.



NAMRU-SA 2014 summer intern, Mr. Jason Chang, presents poster at the 2014 Biomedical Engineering Society annual meeting this October in San Antonio, Texas. (Photo courtesy of NAMRU-SA Public Affairs)

SAN ANTONIO - Jason Chang, who was a 2014 summer intern at the Naval Medical Research Unit – San Antonio (NAMRU-SA) had his poster selected out of 385 submitted in the category of undergraduate research programs for the Biomedical Engineering Society (BMES) annual meeting in October in San Antonio, Texas.

Chang presented a poster on his work, "Efficacy and Degradation Analysis of Heat Labile Antibiotic Compounds Subjected to Thermal Conditions Indicative of PMMA Curing Processes." This research was conducted as part of his summer internship through the Naval Research Enterprise Internship Program NAMRU-SA. The 10 week internships are designed to encourage students to pursue scientific careers and expose them to research and technology efforts within the Department of Navy (DoN).

At NAMRU-SA Chang took part

in a project focused on antibiotic incorporation into polymethyl methacrylate (PMMA), a transparent and rigid plastic, which is used for cranial implants. Specifically, he was involved in assessing antibiotic activities before and after exposure to temperatures representative of the curing process of PMMA. Chang had the opportunity to work in a dental laboratory in the Oral and Maxillofacial Surgery Clinic at San Antonio Military Medical Center (SAMMC).

The internship on Joint Base San Antonio Fort Sam Houston (JBSA) provided a unique opportunity for Chang to not only work with the DoN, but also understand military medicine and how services integrate with one another in the research field.

While at NAMRU-SA Chang toured the Center for the Intrepid, a wounded warrior rehabilitation facility, and the U.S. Army Institute of Surgical

Research Burn Center located within SAMMC hospital. On those visits, he learned just how resilient our warriors are and how the projects at NAMRU-SA align with the distinct needs of our warfighters and the end goals of enhancing health and addressing emergent medical and oral/facial problems in routine and combat operations.

Chang is a senior pursuing a bachelor's degree in biomedical engineering at the University of Texas at Dallas. His scientific interests were broadened by working with the NAMRU-SA Craniofacial Health and Restorative Medicine Directorate under Dr. Mauris DeSilva.

With a record-breaking 861 oral presentations and 1635 posters, Chang was honored to present at one of the largest BMES meetings to date.

Contractor Joins NMRC Mobile Lab Teams in Liberia

(continued from page 14)

and healthcare workers at Island Clinic,” said Patel. “[I would believe] ask any of us working in Liberia and we would say the heroes are the doctors, healthcare workers and patients who have the courage to seek help.”

“It is a pleasure and a privilege to work at BDRD,” said Patel. “BDRD has been my home for three years and I have had tremendous opportunities ... none greater than being part of Operation United Assistance working with the U.S. Navy mobile labs. I want to thank the leadership at BDRD and I will continue to support its goal to defending against the threat of biological attacks.”



Dr. Ketan Patel (far right) pictured with the NMRC Island Clinic mobile lab team, Lt. Jose Garcia (far left); Chief Hospital Corpsman Vilma Bauer; Lt. Christina Farris and Lt. Andrea McCoy. (Photo courtesy of Dr. Ketan Patel)

NMRC Launches Newly Designed Internet Landing Page

Naval Medical Research and Development Enterprise laboratories now have a landing page portal that provides basic information on all laboratories, links to respective websites and contact information. Additionally, general information on each laboratory is provided. Click here to visit the site.



**Naval Medical Research
and Development**
Enterprise Laboratories



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“The outstanding science we do as part of Navy Medicine's Research and Development Enterprise makes our military, the U.S. and the world safer and stronger.”—CAPT John W. Sanders III, MC, USN